

**1630200005 – St. Clair County
Sauget Area 1, Dead Creek
Sediment Containment Cell
Superfund/Technical File**

Reviewer: Rob Watson

Review Dates: November 16, 2000 to November 22, 2000

Re: Response to Comments Part II

REVIEW NOTES

Introduction

On November 3, 2000, Monsanto/Solutia (M/S) submitted additional responses to USEPA's comments made on the Time Critical Removal Work Plan, Dead Creek Sediment and Soil in Sauget and Cahokia. This submittal is considered Part II of Solutia's response to comments. Part II addresses all of M/S's Group 1 comments and my "must have" comments. The format for these review notes follows that of the October 10 and 11, 2000 meeting with Monsanto/Solutia with the Group 1 comments inserted in the appropriate locations.

These review notes pertain solely to the November 3, 2000 submittal. No other aspects of the Design Report were reviewed at this time.

Comment	m/s group	discussion of response to comments
1	None	OK. The response to comments Part II that is the subject of this review adequately addressed this comment.
2	None	OK, the table that will be incorporated into Section 2.0 is adequate.
3	None	OK. The figures will be removed.
4	None	OK. The statement in Section 4.2.1 regarding earlier excavation of the site will be removed.
5	None	OK. The technical data sheets (Cut Sheets) for the geosynthetic materials M/S plan to use were provided and are adequate. These will be included in Appendix H of the Design Report.
6	1	OK. Section 4.1.1 will be revised to require a geotextile be installed between the gravel capillary break layer and the GCL bedding layer. The technical data sheet and strength calculations for the geotextile show that the proposed product will be strong enough for its intended purpose and should not tear.
7	1	OK. While the document still calls for "Tracked In-Place" soils to be used under the GCLs, Specification 02200 has been revised to include a new section (3.7) for the preparation of the soils prior to placement of the GCL material. Specification 02200 includes specifications for the density, moisture content, and requires the surface of the soil to be smooth rolled prior to placement of GCL materials.

8	1	<p>OK. The document now indicates a HDPE geomembrane that is textured on one side will be used for the secondary liner. The textured surface will face the GCL. The side facing the drainage material will be smooth. Figure 4-1 shows the geomembrane used in the primary liner will remain smooth on both sides.</p> <p>The technical data sheets included for Appendix H do not include the height of the textured surface (asperity height) as requested in Comment 8.</p>
9	10	OK, see Specification 2200.
10	6 (technically impractical)	OK. The revisions provided in response to Comment 11 below should provide sufficient protection for the side slope liner materials.
11	6 (technically impractical)	<p>OK. The main concern of this comment was that the liner materials on the side slopes are protected from objects in the wastes that may puncture them. Wording will be added to the end of Section 5.0 and Section 3.3.F in Specification 02225 that requires screened sediments that are free of sharp objects larger than 2" to be placed on the side slopes. The proposed wording is acceptable.</p> <p>At the October 10, 11, 2000 meeting M/S also agreed to place the more highly contaminated material (e.g. Segment B) more to the middle of the fill, not near the bottom or sides. The response does not address this issue.</p>
12	8	<p>OK. A geologic cross section of the site Figure 3.4 was provided. The approximate elevations of the water table are indicated in a table on the same page as the x-section. However, the colors used to identify the strata are too dark. Therefore, the drawing is hard to read.</p> <p>A more legible geologic cross section with all of the information requested in Comment 12 needs to be provided. The colors used to differentiate the geologic strata need to be lighter and the water table should be identified graphically on the cross-section. The information presented in the figure includes a very large distance. Therefore, it is recommended that the geologic cross section and other information be presented on a full size drawing.</p>
13	1	OK. The liner system load calculations to be included in Appendix C of the Design Report are acceptable.
14	1	OK. The anchor system design calculations to be included in Appendix C of the Design Report are acceptable.
16.b, c	6 (technically impractical)	OK. The technical information on GCLs provided in Attachment 8 of the response to comments indicates that the GCL should not become fully hydrated before the confining weight of the waste in the landfill is placed on top of it. This is acceptable.
16.a	10	OK. See above comment on 16.

20.a, b	5, 6 (technically impractical)	OK. M/S provide test data (if appropriate) in Appendix A of the Design Report. However, the response to comments does not indicate when this will be done. The response to comments needs to indicate when M/S will incorporate the test data into Appendix A of the Design Report.
20.c	5	OK. See above comment 20.
21.a	5	OK. The settlement calculations that will be included in Appendix B are adequate.
21.c	3	OK. The settlement calculations that will be included in Appendix B are adequate.
24.a	4	The narrative in Section 4.2.3 needs to be revised in order to address Comment 24.a and make the section consistent with the revised calculations in Appendix C.
24.d	3	OK. With the following exceptions, the revised calculations provided in Attachment 10 appear to be acceptable. The narrative in Section 4.2.3 and the calculations in Appendix C (Attachment 10 to the response to comments) both need to be revised in order to clearly identify the minimum factor of safety (FS) against slope failure that will be acceptable. The FS for slope stability at nonhazardous landfills is 1.5. The FS for slope stability at this site should not be less than 1.5. A lower FS will also result in a lower interface friction angle being used in the design. NOTE: for additional review notes – see the e-mail and phone notes from conversation with Prof. Stark at UIUC both dated 11-17-00.
24.f	3	The interface friction angle should be determined for more than the two interfaces proposed in the response to comments. This is necessary in order to insure that the worst-case friction angle is in fact determined and accounted for in the design. For example, it is recommended that the soil – GCL and soil – smooth geomembrane interfaces should also be evaluated in the shear box.
24.g	1	It is strongly recommended that testing of the liner materials be performed as soon as the manufacturers of these materials are chosen. This testing would be in addition to, not in place of, the CQA confirmation testing. If testing is not done prior to the materials arriving at the site and the test results indicate there is a problem, Monsanto/Solutia need to understand, and agree, that the risk was theirs. Therefore, any schedule delays or cost increases due to unacceptable test results will be their responsibilities.
28.e	6 (technically impractical)	See discussion on Comments 24.d, f. and g. above.

29	7	OK. The revised Specification 02200 that will be included in Appendix E of the Design Report addresses this comment. The wording in Section 4.3.3 needs to be revised to reflect the response to Comment 29 and the provisions in Specification 02200 that address Comment 29.
30	3	OK. The GCL load calculations that will be included in Appendix C of the Design Report are adequate to address the concerns in Comment 30.
31	4	The response solely references the GCL load calculations in Attachment 12 that will be incorporated into Appendix C of the Design Report. No revised wording for Section 4.4.2 was proposed. The wording in Section 4.4.2 needs to be revised to reflect the key provisions and conclusions in the revised GCL load calculations in Appendix C (Attachment 12) that address the concerns in Comment 31.
32 all	1, 7, 1, 2, 4, 1, and 2	The drawings provided in response to Comment 32 are acceptable. However, the narrative of the Design Report also needs to be revised to address the comment. The narrative in Section 4.5 needs to be revised to include the wording in the response to comments for Comment 32, 33 & 34. Specifically, the narrative needs to refer to the revised drawings and describe how the leachate collection, detection and gravel capillary sump systems will function. Of particular concern is how the procedures and the alarm system will function to insure the level of leachate does not accumulate above acceptable levels.
33	1	See discussion on Comment 32.
34	1	See discussion on Comment 32.
39	3, 4	The proposed revisions to Section 2.3 of Appendix F are not acceptable as written. The proposed wording in Attachment 11 needs to be revised to reference the ASTM method that will be used to test the samples, and the "selected geosynthetics" for which interface friction angles will be determined.
40	1	OK. The minimum values for the geotextile properties in revised Specification 02242 are acceptable. They conform to the calculations performed on the geotextile in Attachment 2 of the response to comments. However, the proposed wording in the response to this comment shows the geotextile should be placed between the tracked in place soil and GCL. This is not correct. It needs to be placed between the tracked in place soil and the gravel. The proposed revision to Section 1.3.B.2 of Specification 01010 is not correct. It needs to indicate that the geotextile will be placed between the tracked in place soil and the capillary break layer (gravel).

41	1	OK. The proposed revision to Section 3.2.B of Specification 02150 is acceptable. It requires the contractor to test collected groundwater, determine if it is hazardous waste, and handle it appropriately.
42	1, 2, 2, 2	OK. The revised Earthwork Specification 02200 adequately addresses the concerns in Comment 42.
43	1	OK. The revised Earthwork Specification 02200 adequately addresses the concerns in Comment 43.
44	2	OK. Notes have been added to the revised drawings that indicate the thicknesses of the layers are compacted, not loose.
46.a	7	Review notes from the October 10, 2000 meeting indicate that Solutia agreed to revise the wording in Section 3.6.A.4 of Specification 02200 to more clearly describe fill operations. This section of Specification 02200 was not revised. The wording in Section 3.6.A.4 of Specification 02200 needs to be revised to more clearly describe the filling operations.
48	1	OK. The proposed revisions to Specification 02225 will adequately address the concerns in Comment 48.
49	1	OK. The locations for placement of the geogrids are shown in Figures 4-9 & 4-10.
50	2	OK. The M/S response is acceptable. Panel layout drawings for the geomembrane will be provided to USEPA 30 days prior to installation.
51	1	The revised Geomembrane Specification 02244 that was provided as Attachment 17 does not include all of the parameters cited in GRI Standard GM13. Specification 02244 needs to be revised to include: yield stress and yield elongation.
52	2	OK. The proposed revision to Section 2.4.A of Specification 02244 identifies fusion double seam welding as the preferable type of welding, where feasible. This is acceptable.
53	1	OK. The proposed revision to Section 3.4.E of Specification 02244 indicates that geomembrane panels will be rolled down the side slopes, not pulled up them. This is acceptable.
54	1	OK. The proposed revision to Section 1.4.B.1 of Specification 02245 indicates that rolls of GCL will be stored off the ground from time of delivery until installation. This is acceptable.
55	1	The response to this comment refers to the technical data sheets for the liner materials provided in Attachment 1. While these data sheets are acceptable to describe their properties, they do not specifically address the comment. The response to Comment 55 does not address the comment that Section 2.1 of Specification 02245 refers to a "lock-stitched" GCL.

56	1	<p>The response indicates Table 1 in Specification 02245 was revised to include all parameters in ASTM D-5889 and the minimum values for those parameters. However, the column in Table 1 that identified the minimum values was removed from the Table.</p> <p>The minimum values for all of the parameters in Table 1 in Specification 02245 need to be provided in the Table.</p>
57	1	<p>The response states the short term, long term, and residual GCL strength calculations are provided in Attachment 12. This is not correct. The <u>internal</u> friction angle for the GCL is not discussed. Only <u>interface</u> friction angles between two materials are considered in the calculations.</p> <p>The GCL Loading calculations in Attachment 12, and probably the Liner System Stability Calculations in Attachment 10, need to be revised to include the <u>internal</u> friction angle for the GCL.</p>
58	1	<p>OK. The proposed revision to Section 3.3.B.2 of Specification 02245 indicates that rolls of GCL will be installed such that liquids from a higher panel will not be able to flow underneath a lower panel. This is acceptable.</p>
61	1	<p>In response to Comment 61, transmissivity, the minimum transmissivity value, and test method were added to Specification 02246. However, the minimum value for transmissivity in Specification 02246 is identified as 1 cm/sec. As indicated in my review notes, an acceptable value for transmissivity is on the order of 1×10^{-4} m²/sec. Section 4.5.2 states that the geonet will have a transmissivity equal to 12 inches of sand with a hydraulic conductivity of 1×10^{-2} cm/sec. M/S should make this demonstration prior to requiring a minimum transmissivity in a specification.</p> <p>The minimum value for transmissivity in Specification 02246 is not acceptable or consistent with other portions of the Design Report, and the units of measurement are not correct. The design report needs to demonstrate that the geonet will have a transmissivity equal to 12 inches of sand with a hydraulic conductivity of 1×10^{-2} cm/sec as stated in Section 4.5.2 (see Comment 35). This is the transmissivity value that should be required in Specification 02246. [An acceptable value for transmissivity is on the order of 1×10^{-4} m²/sec.] In addition, the narrative in Section 4.1.1 may need to be revised since it states the hydraulic transmissivity of the geonet will be at least 3×10^{-1} cm²/sec (3×10^{-5} m²/sec).</p>
62	1	<p>OK. The proposed revision to Specification 02932 indicates that IDOT Section 250 Class 1 seed mix will be used for the vegetative cover. This is acceptable.</p>

64/65	7	<p>The organization chart helps address several of the QA/QC concerns. However, at the October 10, 2000 meeting M/S agreed to revise the document to indicate that the CQA Officer will be responsible for taking samples during construction. While the response to Comment 64 indicates this will be the case, the response to comments does not propose to revise the narrative of the Design Report to state this. The narrative in the Design Report should be revised to include the response to Comment 64. For example, Section 3.3 in the revised geonet Specification 02246 still shows that the contractor is responsible for taking confirmation samples. From the response to Comment 64 it appears that the CQA Consultant should perform this job. If this interpretation is correct, Specification 02246 (and portions of other specifications) may also need to be revised.</p>
66	1	<p>The response to Comment 66 states that the CQA manual for geosynthetic components will be revised to incorporate comments on the properties and specifications. However, it also indicates that this manual will not be provided until the final version of the Design Report is submitted. This is not acceptable. The revised CQA manual should have been provided with the November 3, 2000 submittal. The revised CQA manual for geosynthetic materials (Appendix F) should have been provided with the November 3, 2000 submittal. This revised CQA manual needs to be provided for review before the Design Report is finalized.</p>
67	1	<p>OK. The proposed addition of CQA procedures for the GCL (Section 6.0) to Appendix F is acceptable.</p>
68	1	<p>The table (Attachment 23) M/S proposes to incorporate in Appendix F needs to be revised to include earlier comments regarding each of the materials.</p> <p>The Table in Attachment 23 needs to be revised to include the following properties, their test methods, and minimum values: Geomembrane: yield strength, yield elongation, and asperity height, GCL: grab tensile strength.</p> <p>The minimum values for some of the parameters on this table may also need to be revised based on earlier comments in this review (e.g. transmissivity for the geonet, and the minimum internal friction angle for the GCL).</p>
69	1	<p>OK. The proposed revision to Section 2.3.1.3 of Appendix F indicates that the subgrade soils under the geosynthetics will be inspected for the proper parameters. This is acceptable.</p>
70 all	2	<p>OK. The response adequately addresses Comment 70.</p>
71 all	2	<p>OK. The proposed revision to Section 2.8.5 of Appendix F regarding the inspection of the geomembranes for wrinkles adequately addresses this comment.</p>

74	1	See review notes for Comment 66 above. The revised CQA manual for soil materials (Appendix G) should have been provided with the November 3, 2000 submittal. This revised CQA manual needs to be provided for review before the Design Report is finalized.
75	1	OK. A table will be incorporated into Appendix G.
78	1	The response to this comment only addresses the testing of borrow soils for TCL/TAL constituents. It does not address the requirement to analyze soils per the referenced USEPA guidance document. Therefore, the parameters and their frequencies are specified below. [See copies of Tables 2.3 and 2.10 from USEPA Technical Guidance Document titled Quality Assurance and Quality Control for Waste Management Facilities (EPA/600/R-93/182, September 1993).] The soils identified in Tables 1A and 1B in Attachment 24 should be analyzed for the following parameters at the specified frequencies: Moisture Content: 1 test per 2,500 cu yd or each change in material. Atterberg Limits: 1 test per 6,500 cu yd or each change in material. Percentage Fines: 1 test per 6,500 cu yd or each change in material. Percent Gravel: 1 test per 6,500 cu yd or each change in material. Compaction Curve: 1 test per 6,500 cu yd or each change in material. Hydraulic Conductivity: 1 test per 13,000 cu yd or each change in material. The soils identified in Tables 1C in Attachment 24 should be analyzed for the following parameters at the specified frequencies: Field Placed Moisture and Density (rapid tests): 5 tests per acre per lift Water Content (ASTM D2216): one in every 10 rapid moisture content tests. Total Density (ASTM D1556, 1587, or 2167): one in every 20 rapid density tests.
80	1	OK. The proposed revision to Section 4.3.4.8.5 of Appendix G regarding the inspection/testing of the layer bonding adequately addresses this comment.
81	2	OK. The response to Comment 80 adequately addressed this comment.
82	2	The response is adequate to describe how the leachate collection/detection systems are designed to avoid the need for maintenance. However, the narrative still needs to be designed to include this description. The narrative in the Design Report needs to be revised to include the response to Comment 82.
84	2	The response did not fully address the issues in Comment 84. Each of the items in Comment 84 needs to be addressed individually. In addition, the response needs to indicate if the concrete down shoot (and the calculations for it in Appendix D) need to be removed from the application.

86.c	2	OK. The response adequately addresses the concerns regarding the GCL bedding layer in the cover system.
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